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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/11/2005

Morito Akiyama

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EXAMINER

ROSENAU, DEREK JOHN

ART UNIT

PAPER NUMBER

2834

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/556,663	AKIYAMA ET AL.	
	Examiner	Art Unit	
	Derek J. Rosenau	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 and 26-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 November 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :11/11/05
2/17/06 5/14/07 7/3/07 8/12/08.

DETAILED ACTION

Election/Restrictions

1. Claims 1-12 and 26-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 2 September 2008.
2. Applicant's election without traverse of the invention of group III in the reply filed on 2 September 2008 is acknowledged.

Drawings

3. Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The

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abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. With respect to claim 15, it is unclear to what the claimed c-axis belongs. It is unclear if the c-axis is intended to be that of the first wurtzite crystalline layer, the second wurtzite crystalline layer, both, or something else.

8. With respect to claim 16, the terminology "and/or" renders the claim unclear, as it is unclear whether applicant intends to claim both the first and second wurtzite crystalline layers, or either the first or second wurtzite layers. For purposes of examination, the claim will be interpreted as meaning "and" instead of "and/or".

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 13-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Masuo et al. (JP 57-048820).

11. With respect to claim 13, Masuo discloses a laminate (Fig 2) comprising: a substrate (item 10); a first wurtzite layer (item 11) made of a wurtzite crystalline structure compound (Abstract, both AlN and ZnO are wurtzite structure compounds); a functional material layer (item 12) which covers an entire region of the first wurtzite crystalline layer (Fig 2); and a second wurtzite crystalline layer (item 13) which covers the functional material layer (Fig 2) and is made of the wurtzite crystalline structure compound (Abstract, both AlN and ZnO are wurtzite structure compounds), and the first wurtzite crystalline layer, the functional material layer and the second wurtzite layer being stacked on or above the substrate (Fig 2).

12. With respect to claim 14, Masuo discloses the laminate as set forth in claim 13, wherein the substrate is made of any one of a monocrystalline material, a polycrystal material, and an amorphous material (Abstract, glass is an amorphous material).

13. With respect to claim 15, Masuo discloses the laminate as set forth in claim 13, wherein, as best the examiner can ascertain, a c-axis perpendicular to a (0001) surface of the wurtzite crystalline structure compound constituting the first wurtzite crystalline layer and the second wurtzite crystalline layer orients substantially perpendicular to a surface of the substrate (Abstract).

14. With respect to claim 16, Masuo discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer and the second wurtzite crystalline layer

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contain as a main constituent one compound or more selected from the group consisting of aluminum nitride, gallium nitride, indium nitride, and zinc oxide (Abstract).

15. With respect to claim 17, Masuo discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer and the second wurtzite crystalline layer contain aluminum nitride as the main constituent (Abstract).

16. With respect to claim 18, Masuo discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer and the second wurtzite crystalline layer are made of a same constituent (Abstract).

17. With respect to claim 19, Masuo discloses the laminate as set forth in claim 13, wherein the functional material layer contains any one of a monocrystalline material, a polycrystalline material, and an amorphous material (Abstract, Au and Al are both polycrystalline materials).

18. With respect to claim 20, Masuo discloses the laminate as set forth in claim 13, wherein the functional material layer contains a conductive material (Abstract, both Al and Au are conductive materials).

19. With respect to claim 21, Masuo discloses the laminate as set forth in claim 13, wherein the functional material layer contains a metal (Abstract, both Al and Au are metals).

20. Claims 13-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (US 2002/0190814).

21. With respect to claim 13, Yamada et al. discloses a laminate (Fig 14) comprising: a substrate (item 11); a first wurtzite layer (item 42) made of a wurtzite crystalline

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structure compound (Paragraph 45, both AlN and ZnO are wurtzite structure compounds); a functional material layer (item 44) which covers an entire region of the first wurtzite crystalline layer (Fig 14); and a second wurtzite crystalline layer (item 41) which covers the functional material layer (Fig 14) and is made of the wurtzite crystalline structure compound (Paragraph 45, both AlN and ZnO are wurtzite structure compounds), and the first wurtzite crystalline layer, the functional material layer and the second wurtzite layer being stacked on or above the substrate (Fig 14).

22. With respect to claim 14, Yamada et al. discloses the laminate as set forth in claim 13, wherein the substrate is made of any one of a monocrystalline material, a polycrystal material, and an amorphous material (Abstract, silicon can be either a monocrystalline or a polycrystalline material).

23. With respect to claim 15, Yamada et al. discloses the laminate as set forth in claim 13, wherein, as best the examiner can ascertain, a c-axis perpendicular to a (0001) surface of the wurtzite crystalline structure compound constituting the first wurtzite crystalline layer and the second wurtzite crystalline layer orients substantially perpendicular to a surface of the substrate (Paragraph 178).

24. With respect to claim 16, Yamada et al. discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer and the second wurtzite crystalline layer contain as a main constituent one compound or more selected from the group consisting of aluminum nitride, gallium nitride, indium nitride, and zinc oxide (Paragraph 45).

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25. With respect to claim 17, Yamada et al. discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer and the second wurtzite crystalline layer contain aluminum nitride as the main constituent (Paragraph 45).

26. With respect to claim 18, Yamada et al. discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer and the second wurtzite crystalline layer are made of a same constituent (Paragraph 45).

27. With respect to claim 19, Yamada et al. discloses the laminate as set forth in claim 13, wherein the functional material layer contains any one of a monocrystalline material, a polycrystalline material, and an amorphous material (Paragraph 45, Au, Pt, W, and Mo are all polycrystalline materials).

28. With respect to claim 20, Yamada et al. discloses the laminate as set forth in claim 13, wherein the functional material layer contains a conductive material (Paragraph 45, Al, Pt, W, and Mo are all conductive materials).

29. With respect to claim 21, Yamada et al. discloses the laminate as set forth in claim 13, wherein the functional material layer contains a metal (Paragraph 45, both Au, Pt, W, and Mo are all metals).

30. With respect to claim 22, Yamada et al. discloses the laminate as set forth in claim 13, wherein the functional material layer contains a metal having a body-centered cubic structure or a hexagonal close-packed lattice structure (Paragraph 45, Mo and W are both body-centered cubic structures).

31. With respect to claim 23, Yamada et al. discloses the laminate as set forth in claim 13, wherein the functional material layer is made of an elementary substance of

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molybdenum or tungsten, or a compound containing at least one of molybdenum and tungsten (Paragraph 45).

32. With respect to claim 24, Yamada et al. discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer has a thickness of 5nm or more (Paragraph 104).

33. With respect to claim 25, Yamada et al. discloses the laminate as set forth in claim 13, wherein the first wurtzite crystalline layer has a thickness of 50 nm to 200nm (Paragraph 104).

Claim Rejections - 35 USC § 103

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuo et al. in view of Sung (US 2005/0122189).

36. With respect to claim 22, Masuo discloses the laminate as set forth in claim 13. Masuo et al. does not disclose expressly that the functional material layer contains a metal having a body-centered cubic structure or a hexagonal close-packed lattice structure.

Sung teaches a surface acoustic wave device in which the electrodes, or functional material layer, are made of tungsten or molybdenum (Paragraph 76), both of which are metals with body-centered cubic lattice structures.

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At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the W or Mo electrodes of Sung with the device of Masuo et al. as both of these materials are well-known for their suitability for use as electrode materials in surface acoustic wave devices.

37. With respect to claim 23, Masuo discloses the laminate as set forth in claim 13.

Masuo et al. does not disclose expressly that the functional material layer is made of an elementary substance of molybdenum or tungsten, or a compound containing at least one of molybdenum and tungsten.

Sung teaches a surface acoustic wave device in which the functional material layer is made of an elementary substance of molybdenum or tungsten, or a compound containing at least one of molybdenum and tungsten (Paragraph 76).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the W or Mo electrodes of Sung with the device of Masuo et al. as both of these materials are well-known for their suitability for use as electrode materials in surface acoustic wave devices.

38. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuo et al. in view of Hachigo et al. (US 6984918).

39. With respect to claim 24, Masuo discloses the laminate as set forth in claim 13.

Masuo et al. does not disclose expressly that the first wurtzite crystalline layer has a thickness of 5 nm or more.

Hachigo et al. teaches a surface acoustic wave device in which the thickness of the wurtzite material layer (item 3) may be set according to the operational wavelength

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(abstract). It has been held that optimization by routine experimentation would be obvious to a person of ordinary skill in the art (*In re Aller*, 105 USPQ 233). Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to arrive at a thickness of the first wurtzite crystalline layer of 5 nm or more, as doing so would require only routine experimentation.

40. With respect to claim 25, Masuo discloses the laminate as set forth in claim 13.

Masuo et al. does not disclose expressly that the first wurtzite crystalline layer has a thickness of 50 nm to 200 nm.

Hachigo et al. teaches a surface acoustic wave device in which the thickness of the wurtzite material layer (item 3) may be set according to the operational wavelength (abstract). It has been held that optimization by routine experimentation would be obvious to a person of ordinary skill in the art (*In re Aller*, 105 USPQ 233). Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to arrive at a thickness of the first wurtzite crystalline layer of 50 nm to 200nm, as doing so would require only routine experimentation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is (571) 272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leung Quyen can be reached on (571) 272-8188. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek J Rosenau
Examiner
Art Unit 2834

/D. J. R./
Examiner, Art Unit 2834

/Jaydi SanMartin/
Primary Examiner, Art Unit 2834